

19U207

(Pages: 2)

Name : .....

Reg.No : .....

**SECOND SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2020**

(CBCSS - UG)

**CC19U CHE2 B02 : THEORETICAL AND INORGANIC CHEMISTRY II**

(Chemistry - Core Course)

(2019 Admission - Regular)

Time: 2.00 Hrs

Max. Marks: 60

Credit: 2

(Draw diagram wherever necessary. The students can answer all questions in sections A & B)

**A. Short answer questions. Each question carries 2 marks.**

1. Mention one important failure of classical physics.
2. Explain briefly Plank's quantum hypothesis.
3. Write the expression for energy of an electron in the Bohr orbit  $n=2$  and explain the terms.
4. What are non commuting operators?
5. Write the Schrodinger equation for particle in three dimensional box.
6. What are the  $n$ ,  $l$  and  $m$  values for an electron in the  $3p_z$  orbital?
7. State Hund's rule of maximum multiplicity.
8. What is Born-Oppenheimer approximation?
9. State variation theorem.
10. Write down Hamiltonian for  $H_2$  molecule.
11. How does the MO theory explain the paramagnetism of  $O_2$ ?
12. Write bond order, number of unpaired electrons and magnetic behavior of  $Ne_2^+$ .

**(Ceiling: 20 Marks)**

**B. Short essay questions (Paragraph). Each question carries 5 marks.**

13. Derive de Broglie equation.
14. Write the time dependent and time independent Schrodinger equation and explain the instances they are used.
15. Write down the mathematical statement of Heisenberg's uncertainty principle and explain the terms.
16. Describe the separation of wave function of an electron in the hydrogen atom and explain how  $n, l$  and  $m$  quantum numbers are derived.
17. What is LCAO principle?
18. Make comparison of VB and MO theories.
19. Discuss shape of  $\text{BF}_3$  molecule on the basis of hybridization.

**(Ceiling: 30 Marks)**

**C. Essay questions. Answer any one question.**

20. Discuss about the line spectra of hydrogen atom. How did Rydberg and Ritz explained the line spectrum?
21. State and explain postulates of quantum mechanics.

**(1 × 10 = 10 Marks)**

\*\*\*\*\*